

# Identification of Factors affecting the Symphysis Fundal Height and Prediction of Low Birth Weight (LBW) during Antenatal Period

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## ABSTRACT

**Objective:** To determine the factors affecting the height of fundus and estimation of gestational age and low birth weight during antenatal period.

**Material and methods:** This descriptive and observational study was conducted at Outpatient department of the Bilawal Medical College with the collaboration of private sector (Hajiani) Hospital in Hyderabad from December 2018 to May 2019. All pregnant women attending the antenatal OPD were included. After taking verbal informed consent and detailed history information gathered, regarding demographic. Patients were assessed examined for symphysis fundal height and ultrasound done to confirm the findings, All the data were recorded in pre-designed proforma and data was analyzed using SPSS version 21.

**Results:** Total 140 females were studied and most of the cases 65.7% were 21-30 years old. 23.6% females were primipara, 74.3% were multipara and only 2.1% were grand multipara. There was a significant positive correlation between gestational age and symphysis-fundal height  $r=0.883$ . There were several causes of discrepancy like low birth weight (LBW)16.4%, intrauterine growth retardation (IUGR)14.2% twin pregnancy 12.9%, Polyhydramnios7.9% Oligohydramnios 7.1% cases & 2.9% were cases of Engagement of head at term.

**Conclusion:** The use of symphysis-fundal height measurement is helpful to gauge the correct gestational age in most of the cases, which corresponded well with gestational age confirmed using other techniques like ultrasound. It can be relied upon to give a preliminary cursor of discrepancy in the gestational age in low resource settings. Although low birth weight (LBW), intrauterine growth retardation, twin pregnancy, polyhydramnios, oligohydramnios and engagement of head at term were observed to the causes of discrepancy and factors affecting the height of fundus.

**Keywords:** Symphysis-fundal height (SFH), gestational age, Intrauterine growth retardation (IUGR).

## INTRODUCTION

The distance in centimeters between the upper border of the symphysis pubis and the top of the fundus curvature is known as symphysis-fundal height (SFH).<sup>1,2</sup> Measurement of SFH is the primary screening tool, which frequently uses to the fetal size assessment in low resource settings in the non-availability of ultrasound technique.<sup>3,4</sup> This feasible biomarker measures the distance between the pubic symphysis and the highest height fundal height of the uterus with tape measurement in the complete contact with the abdominal skin midline of the mother.<sup>3</sup> accurate and comprehensive evaluation of gestational age is significant for maternal and neonatal care. Interventions timing at the moment of delivery is determined by gestational age, which helps to balance the danger of death of the fetus, including morbidity and mortality of the neonates.<sup>5</sup> Gestational age of a specific pregnancy is frequently unknown or erroneous in the middle- and lower-income nations. The 1<sup>st</sup> day of last menstrual period has traditionally been measured for the date pregnancy. Nonetheless, last menstrual period (LMP) has limitations, such as varied menstrual cycle lengths, misapprehension of the initial bleeding, and forgetting the date, with around two-thirds of females in the middle- and lower-income nations having no LMP at all.<sup>6,7</sup> The early pregnancy dating scan is the gold standard evidence for the detection of gestational age; however, the approach is diverse and typically late in pregnancy, when it is less consistent for dating.<sup>8</sup> Preterm and Low birth weight is a leading society health setback, causing considerable morbidity and mortality of the neonates. The main

determinants of Low birth weight (LBW) are gestational duration and fetal growth rate.<sup>9</sup> Genetics, diet, short maternal stature, low pre-pregnancy weight and malaria are all key factors of LBW newborns in underdeveloped nations. Weight of pre-pregnancy, parity, smoking, maternal height, malfunction of the placenta, marital status, gender of the fetus, inheritance and numerous socio-economic factors are all possible influences on birth weight.<sup>10</sup> The gestational duration of a pregnancy is frequently unclear or imprecise in low- and middle-income countries (LMICs).<sup>12</sup> When ultrasound or menstruation data are missing in the majority of LMICs, the SFH is widely employed to estimate pregnant gestational age (GA).<sup>13</sup> If the fundal height is larger for dates, the mother may have given the wrong LMP, or she may have twin pregnancy, diabetes, polyhydramnios, uterine fibroids, or a molar pregnancy. Similarly, if fundal height is smaller than expected, the mother may have given the wrong LMP, or she may have oligohydramnios, hypertension, poor nutrition or she may be drinking alcohol, taking other harmful drugs, cigarette smoking or the baby is low birth weight (LBW). Additional factors that may influence the relation of fundal height with gestational age include mother's tall or slim frame, short or heavy frame and status of maternal bladder and clinician bias. Measurement of the SFH is a simple, safe, reliable and the rapid test to screen low-risk individuals that is noninvasive and economical, particularly in low-resource health settings where ultrasound facilities are not easily accessible in most local clinics and hospitals.<sup>1,14</sup> The

measurement of the SFH is often used to determine fetal IUGR and an evaluated IUGR may cause of death of the fetus along with raises in the perinatal morbidity and mortality.<sup>15</sup> SFH is a single-dimensional, imperfect measure that is affected by various parameters like uterine fibroids, maternal parity, the position of the fetus and station.<sup>12</sup> Furthermore, few research has matched the accuracy of SFH and other maternal anthropometrics to an earlier ultrasound gold standard in predicting gestational age.<sup>12</sup> Although this study has been conducted on the factor affecting the height of fundus and its correlation with gestational age and causes of discrepancy.

**MATERIAL AND METHODS**

This descriptive and observational study was conducted at Outpatient department of the Bilawal Medical College with the collaboration of private sector (Hajiani) Hospital in Hyderabad from December 2018 to May 2019. All pregnant women attending antenatal OPD, either of age or parity were included. Women with severe chronic medical disorders, eclampsia, known cases of pregnancy with fibroid or ovarian tumor, obese, antepartum hemorrhage and those were not willing to participate in the study were excluded. After taking verbal informed consent and detailed history information gathered, regarding demographic data, including age, education, occupation, socioeconomic status, residence and gestational age, last menstrual period, literacy of wife and husband, past medical and obstetric history, patients were examined and symphysio-fundal height measured in supine position with empty bladder. The measurement was then taken with a measuring tape from the skin directly above the upper edge of the pubic symphysis to the noticeable point at the fundus and ultrasound done to confirm the findings and evaluate the cause of discrepancy All the data were recorded in pre-designed proforma, and data were analyzed using SPSS version 21.

**RESULTS**

Table 1: Patients distribution according to demographic characteristics n=140

Variables	Frequency	
Age	15-20 years	24(17.1%)
	21-30 years	92(65.7%)
	31-40 years	24(17.1%)
Gravidity	Primary Gravida	33(23.6%)
	Multigravida	104(74.3%)
	Grand-Multigravida	03(02.1%)
Residence	Urban	54(38.6%)
	Semi-urban	19(13.6%)
	Rural	67(47.9%)
Socio-economic Status	Upper	04(02.9%)
	Middle	82(58.6%)
	Low	54(38.6%)
Maternal Literacy Rate	Literate	76(54.3%)
	Illiterate	64(45.7%)
Husband's Literacy Rate	Literate	65(46.4%)
	Illiterate	75(53.6%)

Total 140 females were studied and they were grouped according to their age as 17.1% cases were between the age of 15-20 years, 65.7% were 21-30 years old and 17.1% were 31-40 years old. Out of all 23.6%

females were primipara, 74.3% were multipara and only 2.1% were grand multipara. Most of the patients 47.9% were rural residents and 38.6% were urban resident and 13.6% were resided in Semi-urban areas. Most of the patients (38.6%) were poor the socioeconomically and educational status shown in table.1

There was a significant positive correlation between gestational age and symphysis-fundal height r=0.883. Fig:1

Our study showed a highly significant relationship of height of fundus with gestational age of which 38.5% were normal while cases of discrepancy were recorded which included low birth weight (LBW)16.4%, intrauterine growth retardation (IUGR)14.2%, twin pregnancy 12.9%, polyhydramnios 7.9% Oligohydramnios 7.1% cases and 2.9% were cases of engagement of head at term. Table.2

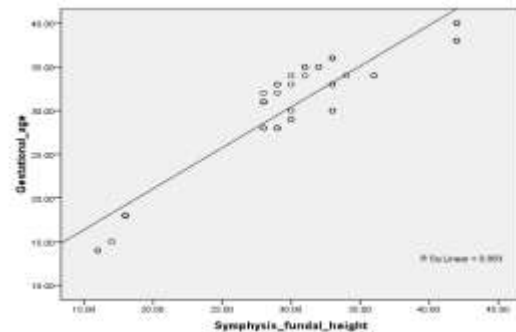


Fig 1: Correlation between gestational age and symphysis-fundal height n=140

Table.2: Frequency of the causes of discrepancy n=140

Cause of discrepancy	Frequency
Normal	54(38.5%)
Low Birth Weight	23(16.4%)
Intrauterine growth restriction (IUGR)	20(14.2%)
Twin Pregnancy	18(12.9%)
Polyhydramnios	11(12.9%)
Oligohydramnios	10(07.1%)
Engagement of head at term	04(02.9%)

**DISCUSSION**

Assessment of gestational age by a symphysio fundal height is an important part of obstetrical examination. The space between the pubic symphysis and the uterus's fundus is measured using the SFH method, which is an inexpensive, simple and commonly used way of diagnosing aberrant fetal growth. Measurement is made by locating the upper boundary of the symphysis pubis and fundus of the uterus and measuring the distance between them using a tape measure for fetuses after 24 weeks of gestation. The primary and most significant goal of SFH assessment is to detect underdeveloped fetuses, as a delay in diagnosing this fetal disease can result in intrauterine death. It can also detect multiple pregnancies, large for gestational age fetuses, oligohydramnios and polyhydramnios.<sup>16</sup> Clinical examination and ultrasound findings are used in our study. One of the clinical predictors was maternal SFH measurement, which is one of the most widely used and accessible methods for estimating fetal weight and monitoring fetal growth during pregnancy. Although only using SFH measurement had apparently low sensitivity for

detecting growth and birth weight abnormalities, similar findings confirm by other studies (ranged 16–45%).<sup>17-19</sup> In this study there was a positive correlation between SFH measurement and gestational age but in many cases there was a discrepancy which caused by several factors including low birth weight (LBW), intrauterine growth retardation (IUGR), twin pregnancy, polyhydramnios, oligohydramnios and engagement of head at term. On other hand, the Sahajpal R et al<sup>20</sup> suggested that antenatal care interventions could use SFH as a low cost and low technology method for monitoring fetal growth and surveillance of high-risk pregnancies, while inconsistently Lee AC et al<sup>12</sup> concluded that, they were unable to accurately predict gestational age using maternal pregnancy anthropometric measurements. Increased coverage and training of ultrasonography should be prioritized in efforts to enhance gestational age dating before birth. Peter JR et al<sup>15</sup> observed that there was insufficient evidence to determine whether SFH measurement is effective in detecting IUGR and they did not therefore recommend any change of current practice. The evidence for using SFH measurement has far-reaching consequences for low-income countries that lack access to serial ultrasonography fetal testing. It is also important in high-income nations, where SFH testing is still employed as a screening technique to detect IUGR.<sup>15</sup> On other hand Pay AS et al<sup>21</sup> reported that with other clinical observations, findings about medical issues, and past obstetric history, SF height can be used as a clinical indicator. However, because SF height has a significant false-negative rate for SGA, physicians must be aware of its limits.<sup>21</sup>

## CONCLUSION

The use of symphysis-fundal height measurement is helpful to gage gestational age in most of the cases, which corresponded well with gestational age confirmed by other techniques like ultrasound but not recommend the only current practice without ultrasound because there were valuable discrepancies by several factors like low birth weight (LBW), intrauterine growth retardation, twin pregnancy, polyhydramnios, oligohydramnios and engagement of head at term were observed to the causes of discrepancy and factors affecting the height of fundus. Although, the patients can be suspected for gestational complications, those having known gestational age and then their gestation age differed from FH values. Further large-scale control trials should be done on such subject

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